

The Impact of Trace Additives on the Apparent Solubility of Hydrogen in Heavy Oil and Related Feedstocks at Low and High Temperatures

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Objectives

- Verify the accuracy of the proposed indirect hydrogen solubility measurement method by duplicating some accurate solubility data reported in the literature.
- Confirm the unusually high hydrogen solubility measurements for Athabasca bitumen + catalyst at room temperature. Values as much as 10 times greater than expected were found during preliminary and imprecise experiments.
- Determine the relative impact of additives such as carbon black on the apparent solubility of hydrogen in model feedstocks over a range of temperatures and pressures.

Accomplishment to Date

In this period of performance we concentrated on

- a. Apparatus completion and testing
- b. Calibration
- c. Improve the volume measurement of the view cell and the hydrogen feed system.
- d. Reduce the volume of the transfer lines and connections.
- e. Verified the accuracy of the indirect hydrogen solubility measurement.

Collection of data is ongoing.

Students Supported Under This Grant

The following undergraduate engineering students were supported under this grant:

1. Ivory Alexander is a senior in Chemical Engineering at CAU and is due to graduate in May 2002.
2. Jenine Breland is a senior in Chemical Engineering at CAU and is due to graduate in December 2002.

Plan For the Coming Year

- a. Complete solubility runs.
- b. Complete the evaluation of the Data
- c. Performance of Apparent Solubility Experiments
- d. Confirm the unusually high hydrogen solubility measurements for Athabasca bitumen at room temperature.
- e. Determine the relative impact of additives such as carbon black

Articles, Presentations, and Student Support Conference Presentation

To be presented at the American Chemical Society